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CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW).

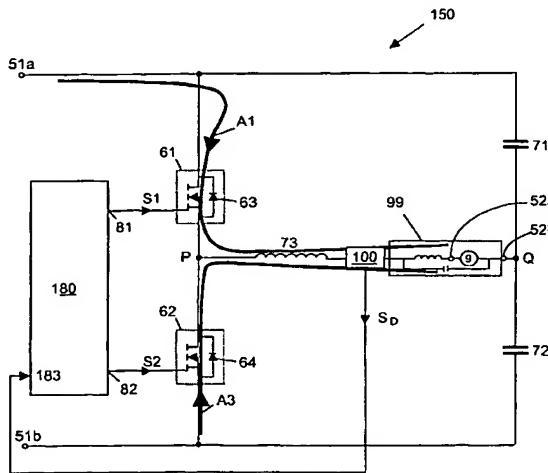
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Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM,

[Continued on next page]

(54) Title: DRIVER FOR A GAS DISCHARGE LAMP



(57) Abstract: Driver (150) for a gas discharge lamp (9) comprises: an arrangement of two MOSFET switches (61, 62) connected in series between two input terminals (51a, 52b); an inductor (73) connected in series with said lamp (9), this series arrangement being coupled to a node (P) between said two switches; a control unit (180) providing control signals (S1, S2) to said two switches. During a first commutation interval (41), a lamp circuit current (ILC) has only a first direction while during a second commutation interval (42) said lamp circuit current has only an opposite direction. In each commutation interval (41, 42), during a first operational phase (43) said lamp circuit current has a continuously increasing level while during a second operational phase (44) said lamp circuit current has a continuously decreasing level. The control unit (180) is designed to generate its control signals (S1, S2) such that said two switches are always, switched substantially simultaneously in counter-phase. The mosfets are used in reverse conduction mode also, to avoid body diode conduction (synchronous rectification).

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KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/TD 03/03013

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H05B41/282

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H05B H03K G01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 932 976 A (UCHIHASHI KIYOAKI ET AL) 3 August 1999 (1999-08-03) figures 6-8 -----	1-3
X	US 5 917 290 A (SCHLECHT MARTIN FREDERICK ET AL) 29 June 1999 (1999-06-29) column 9, line 47 - column 12, line 17; figures 6,13 -----	1-7
A	JP 2001 284087 A (MATSUSHITA ELECTRIC WORKS LTD) 12 October 2001 (2001-10-12) figures 11-13 -----	1-8

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority, claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 October 2003	25. 03. 04
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patenlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Maicas, J

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No

PCT/IR 03/03013

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5932976	A	03-08-1999	CA JP	2224300 A1 10284265 A		14-07-1998 23-10-1998
US 5917290	A	29-06-1999	AT CA CN EP WO JP TW	261234 T 2276726 A1 1249896 T 0948878 A1 9925159 A1 2001513253 T 467465 Y		15-03-2004 20-05-1999 05-04-2000 13-10-1999 20-05-1999 28-08-2001 01-12-2001
JP 2001284087	A	12-10-2001	NONE			

INTERNATIONAL SEARCH REPORT

International Application No. PCT/IB 03/03013

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8

Driver for a gas discharge lamp comprising:

- input terminals;
- output terminals;
- two controlable switches (forming a bridge);
- an inductor;
- a control unit design to generate the control signals for the switches so that they are always switched substantially in counter phase and at low and high frequency operational phases.

2. claims: 9-19

A zero current crossing detector comprising a transformer being designed to be magnetically saturated at very low current levels.

INTERNATIONAL SEARCH REPORT

PCT/IB 03/03013

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-8

Remark on Protest

The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.